

## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

FCC ID: 2AURE-MDB11

### EUT Specification

<b>EUT</b>	<b>Xiaomo Video Doorbell</b>
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz & 433.92MHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input type="checkbox"/> Others: 2.402GHz~2.480GHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Multiple antenna <input type="checkbox"/> Single antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	WIFI: 16.39dBm (0.0436W); 433.92:-15.3dBm(0.00003W)
<b>Antenna gain (Max)</b>	WIFI:1 dBi; 433.92MHz:0 dBi
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	<b>F/300</b>	<b>6</b>
1500-100000	--	--	<b>5</b>	<b>6</b>
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	<b>F/1500</b>	<b>6</b>
1500-100000	--	--	<b>1</b>	<b>30</b>

## Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = output power to antenna in Mw

$G$  = gain of antenna in linear scale

$\pi = 3.1416$

$R$  = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE,  $1mW/cm^2$ . If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

## Measurement Result

### 2.4G WiFi:

Operating Mode	Channel Frequency (MHz)	Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
802.11b	2412	15.14	15.14±1	16.14	1	0.0103	1
	2437	15.07	15.07±1	16.07	1	0.0101	1
	2462	14.70	14.70±1	15.70	1	0.0093	1
802.11g	2412	14.37	14.37±1	15.37	1	0.0086	1
	2437	16.39	16.39±1	17.39	1	0.0137	1
	2462	15.96	15.96±1	16.96	1	0.0124	1
802.11n (HT20)	2412	15.00	15.00±1	16.00	1	0.0100	1
	2437	16.39	16.39±1	17.39	1	0.0137	1
	2462	15.86	15.86±1	16.86	1	0.0122	1
802.11n (HT40)	2422	16.30	16.30±1	17.30	1	0.0135	1
	2437	15.86	15.86±1	16.86	1	0.0122	1
	2452	16.23	16.23±1	17.23	1	0.0132	1

**433.92MHz:**

Channel (MHz)	Antenna Gain (dBi)	Max Output Power (dBuV/m)	Max Output power (dBm)	Power Included Tune-up(dBm)	Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
433.92	0	79.96	-15.3	-14.3	0.74e-5	1

**MPE Calculation Method**

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

R = Separation distance between radiator and human body (m)=0.2m

The formula can be changed to

$P_d = P_{out} * G / (4 * \pi * R^2)$

$EIRP = E - 104.8 + 20 \log D = 79.96 - 104.8 + 20 \log 3 = -15.3 \text{ dBm}$

**The SAR measurement is not necessary.**